National Aeronautics and Space Administration

Office of the Administrator
Mary W. Jackson NASA Headquarters
Washington, DC 20546-0001

April 5, 2023

General Lester L. Lyles, USAF (Ret.)
Chair, NASA Advisory Council
NASA Headquarters
Washington, DC 20546

Dear General Lyles:

Enclosed is NASA's response to the NASA Advisory Council (NAC) Recommendation 2022-01-02: All NASA Mission Directorates Re-evaluate Program Schedules and Manifest Due to COVID-19 Pandemic Supplier Performance. This recommendation was publicly deliberated during the NAC virtual meeting held on March 1-2, 2022.

Please do not hesitate to contact me if you or the Council would like further background on NASA's response.

I look forward to receiving continued advice from the next NAC meeting.

Sincerely,

Bill Nelson

Enclosure

NASA Advisory Council Recommendation

All NASA Mission Directorates Re-evaluate Program Schedules and Manifest Due to COVID-19 Pandemic Supplier Performance
2022-01-02

Name of Committee:	Human Exploration and Operations Committee
Chair of Committee:	Mr. Wayne Hale
Date of Council Public Deliberation:	March 1, 2022
Short Title of Recommendation:	All NASA Mission Directorates Re-evaluate Program Schedules and Manifest Due to COVID-19 Pandemic Supplier Performance

Recommendation:
The Council recommends that all NASA Mission Directorates assess those elements of the launch manifest and program development schedules for which material procurement is on the critical path and ensure that sufficient planning buffer has been incorporated to address the mid-pandemic supply base performance.

Major Reasons for the Recommendation:
Due to the COVID-19 global pandemic and the impact on the global labor market, microchip availability, and general industry impairment, typical delivery lead times for material procurements are running between 2x - 5x of what is normal.

Consequences of No Action on the Recommendation:
NASA's various projects with near and intermediate term material procurements may miss schedule commitments due to unforeseen and unmitigated delivery schedule and quality risks from key suppliers. Given the scale of the programs, significant schedule slips due to material procurements will have significant downstream cost impacts to the affected programs.

NASA Response:
NASA concurs and has on-going efforts underway to assess the supply chain and associated issues, the details of which are covered further as part of the response. Initial information was gathered in 2020 and periodically reported as part of the overall COVID-19 impacts at the NASA Baseline Performance Review meeting. The programs and projects now include this as part of normal reporting. COVID-19 has impacted NASA projects in multiple ways, including facility shutdowns, restarts, and reduced on-site access due to social distancing and cleaning protocols; interruptions to testing and construction efforts; disruptions in travel to both domestic and international partner locations; and pressures on the overall aerospace

supply chain. NASA cost reserves and schedule margins are under pressure as projects utilize some of those resources to offset COVID-19-related impacts. These pandemic-related pressures on cost reserves and schedule margin, in turn, leave fewer reserves and margins to address other risks that are expected in development of NASA's complex missions.

To date, NASA has notified Congress of nine projects across the Agency that have experienced cost and schedule growth due in part to COVID-19 pressures. These projects include the Roman Space Telescope, James Webb Space Telescope, Geostationary Carbon Observatory (GeoCarb), Surface Water and Ocean Topography, the NASA-Indian Space Research Organization Synthetic Aperture Radar, the Orion exploration crew vehicle, the On-orbit Servicing, Assembly, and Manufacturing 1 and Solar Electric Propulsion technology demonstration missions, and the Low-Boom Flight Demonstration.

It is difficult to project a specific estimate of the total long-term impact of COVID-19 on Agency programs and missions at this time. In March 2021, the NASA Office of the Inspector General noted that the total Agency impact due to COVID-19 could be nearly $3 billion (COVID-19 Impacts on NASA's Major Programs and Projects, IG-20-016, March 31, 2021). Even as COVID-19 appears to be transitioning from a pandemic emergency to a more long-term endemic health issue, a final accounting of the full impact of the COVID-19 pandemic on Agency activities will not be available until well after the Agency and its contractors have resumed normal operations.

Supply chain monitoring, mitigation, and related issues is a broad area and has many layers and related topics. Effective issue identification, resolution, and mitigation first requires understanding the "playing field." NASA has several interrelated efforts underway to assess, monitor, and address this broad ecosystem of supply chain issues. A *Supply Chain and Related Issues Forum,* led by NASA's Associate Administrator for Space Security Interests, in the Office of the Administrator, is meeting monthly to ensure Agency-level awareness, discussion, and action across the component initiatives and areas. The Forum is supported by members from several offices including of the Office of Safety and Mission Assurance (OSMA), Office of the Chief Engineer (OCE), Office of Procurement (OP), Office of the Chief Financial Officer (OCFO), Office of International and Interagency Relations, Office of the General Counsel, Office of Technology, Policy, and Strategy (OTPS), Office of the Chief Scientist, the Principal Advisor for Enterprise Protection, and the Chief Program Management Officer.

For NASA hardware and physical activities, NPR 7120.5F (NASA Space Flight Program & Project Management Requirements, effective 8/3/21) in combination with NPR 8735.2C (Hardware Quality Assurance Program Requirements for Programs & Projects) requires *Industrial Base and Supply Chain Risk Management (SCRM) Strategy and Status* for Key Decision Points starting in Phase A (System & Mission Definition Review).

Systematically building and maintaining visibility into the supply chains for mission programs and projects is the basis for pro-active Supply Chain Risk Management (SCRM) supporting situational awareness, planning, risk analysis, and informed decision-making at project and enterprise levels.

The OSMA SCRM program launched the NASA Supply Chain Insight Central (SCIC) information and analysis services platform for operational use in March 2021. The SCIC

captures supplier data, interrelates it, and provides it to Programs and Projects to enhance the ability to find SCRM data and increase supplier risk awareness. The design of SCIC provides for aggregating SCRM data collected internally with data from external sources (e.g., Government-Industry Data Exchange Program). As data is increasingly fed to the SCIC database, it will increasingly be able to derive supply chain maps for past and future NASA developments providing insight about Project risk exposure. SCIC also provides a repository for SCRM-related reports. SCIC leverages Goddard Space Flight Center's (GSFC's) Supplier Insight database expanding the GSFC-only dataset by adding OSMA's data from the former Supplier Assessment System (SAS) database. Increased data acquisition either by direct entry or through platform-to-platform interfaces is necessary to achieve the above-stated objectives. NASA's quality policy requires all Programs and Projects to add their supplier audit and assessment data to SCIC and to screen suppliers against the SCIC data set to ensure crosscutting supplier issues can be found, are found, and are reviewed (Mission hardware only; per OSMA policy NPR 8735.2).

Current actions underway to support the integration of this platform across the Agency include:

- NASA acquisition policy and requirements to increase supply chain data delivery from the mission hardware developers and entry into SCIC by Programs and Projects. The NASA Headquarters (HQ) team includes OSMA, Office of the Chief Information Officer, OP, and OCFO.
- Provide database structure to host data from NASA's membership in the Space Industrial Base working group. The NASA HQ team includes OSMA and OCE.
- Provide database structure to host data from quality assurance tasks delegated to Defense Contract Management Agency. OSMA is leading this effort.
- Real-time training and demos have been provided since March 2021 and continue to ensure all users, across stakeholder organizations (OSMA, OCE, OP, Mission Directorates), are able to comply with current and future quality assurance.

For NASA information and communications technology components, including flight hardware, the Enterprise Protection Program has established a Supply Chain Security Working Group (SCSWG). The SCSWG held its first meeting in May 2022 and will be meeting monthly. The SCSWG will coordinate with Agency organizations to improve practices to adequately address the current and future threat environment impacting NASA's supply chain. The initial focus of the SCSWG is to work with Centers and Mission Directorates to ensure flight program procurements include supply chain security screening processes equivalent to, and consistent with, institutional/corporate processes.

In support of the Space Industrial Base Working Group (SIBWG), an interagency collaboration, NASA has developed the Critical At Risk Industrial Technology List (CARITL). The CARITL consists of "at risk" building block space systems and essentially includes high Technology Readiness Level items such as raw materials, parts, components, and subsystems. Currently there are over 60 items on the list which are categorized by mission type (human or robotic spaceflight, or common to both). Input to the list comes from across NASA and is reviewed biannually at the Agency Program Management Council. The approved CARITL is then used for discussions annually at the SIBWG meeting to prioritize across space agencies for support, as well as for Strategic Radiation Hardened Electronics Council, and the Joint Army-Navy-NASA-Air Force Interagency discussions. In addition,

the CARITL, which is accessible to all NASA projects, is used for awareness and assistance in mission development planning. Recently, the CARITL has been combined with the SCIC database to provide broader Agency insight into the companies and space products that can potentially impact missions.

NASA is enhancing and linking these efforts to other initiatives and fora. For example, supply chain integrity and health has become a major issue for NASA's key national security space partners. At the Administrator-level, there is a "Space Partnership Council" which also includes the Secretary of the Air Force, Chief of the Space Force, and Director of the National Reconnaissance Office. The Council has added particular attention to this topic. As part of this effort, how to better utilize and energize the SIBWG as a venue to coordinate on supply chain issues is underway. NASA is also looking to formalize relationships with the Department of Defense to enable the Agency to work closely with the Joint Federated Assurance Center and other sources of supply chain threat information.

Additionally, given the emergence of greater global strategic competition and the war in Ukraine, NASA's efforts with its government partners on foreign investment and influence are also being linked to the overall supply chain effort. Related to specific threats to NASA's missions and capabilities, the Office of Protective Services and the Enterprise Protection Program are integral parts of this larger initiative.

OTPS, in cooperation with NASA Mission Directorates and Offices, is conducting a joint NASA-Department of Commerce Civil Space Industrial Base and Supply Chain Survey. The effort seeks to improve visibility into the current and prospective performance of the civil space industrial base and supply chain. Specifically, it will assess supply chain impacts resulting from the COVID-19 pandemic; trends in mergers and acquisitions; financial health of critical suppliers; foreign sourcing and dependencies; workforce and Science, Technology, Engineering, and Math practices; patenting, Intellectual Property, and other measures of knowledge production; and other areas of interest. The first survey tranche to roughly ~1000 companies will be released in 2022, with a second tranche in 2023.

Lastly, an internal assessment team has been established to look across all of these areas of supply chain and industrial base efforts are underway that look for gaps and other potential areas for the Forum to consider.